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PREFACE.—Believing that Dr. Tuffnell has presented very important views on the treatment of internal aneurism, I have had a few copies of this paper printed from the *Medical Journal*. Dr. Tuffnell's entire pamphlet should be re-published in this country.

H. I. B.

CASE OF THORACIC ANEURISM—DEATH—AUTOPSY. REMARKS ON THE TREATMENT OF INTERNAL ANEURISM.

[Read before the Boston Society for Medical Observation, February, 1866, and communicated for the Boston Medical and Surgical Journal.]

By HENRY I. BOWDITCH, M.D.

A MERCHANT, formerly a mariner, born in Europe, but for the last two years a resident in Massachusetts, called on me, December 2d, 1865, with a letter from his attending physician, asking consultation. His history was as follows:—

He had usually enjoyed excellent health, except that when on the African coast he had suffered from the fever incident to that climate, and ever afterwards had had at times temporary and slight febrile exacerbations like those suffered on that coast. They do not appear to have injured in a permanent manner his usual health. For the past year he had occasionally spoken to his wife of some pains in the thorax, but they were of so trivial a character that she thought little of them. During the same period he had had some difficulty in micturition, obliging him to rise four or five times each night in order to urinate. He had formerly smoked "about all the time," but of late he had used tobacco much less freely, and with great relief to palpitation, which he had attributed to the inordinate use of this article. With the above exceptions, and while in the possession of apparently the most robust health—being able to come from the town where he resided, fourteen miles distant, into the city for the transaction of business and to return with perfect ease each day—he was seized, about two months before I saw him, with the following symptoms. He was not aware of having had any special strain, or of any other accident sufficient to cause them. He had gone to bed in his accustomed health, was awakened suddenly in the night, and found himself with almost complete aphonia and a certain hoarseness of breathing. No other obvious symptoms, except the slightest dyspnoea at first, which, however, soon subsided. No chill or heat, or sign of acute inflammatory or febrile disease. This peculiar hoarseness of breathing and speaking remained ever after until his

death. In a day or two, severe neuralgic pains began to shoot up on both sides of the face and head, especially at the right side. This headache continued in spite of all remedies. It was especially severe at night, preventing quiet sleep. The palpitation, which after leaving off the tobacco had decidedly lessened, now returned, at times violently. He had applied to a homœopathic practitioner, and to the use of his medicines the increase was attributed. Finally, three days before I saw him, he had consulted the physician who sent him to me. All the symptoms had been gradually augmenting. His attending physician had examined the urine and had found no albumen in it. On further inquiry, I elicited the following. From his first attack he had had, at times, very severe paroxysmal and ineffectual cough; sometimes quite dry, at others accompanied by copious frothy sputa, never bloody. Within the week previous, violent pains had set in between the shoulders, shooting around the left side of the thorax. He had also lost some appetite and some strength. His nights had become very distressing from the influence of the pains—needing large opiates for relief. He had had no hectic or marked fever, and had preserved a good degree of strength. During the week previous, he had also noticed a little difficulty in standing erect, which was not relieved by bending forward, but rather by throwing the spine a little backward. At my office he appeared like one in perfect health, except that he was hoarse, as from accumulation of mucus about the larynx, but the peculiar, *moist*, character of the hoarseness was unchangeable. His countenance was easy, showing no evidence of serious disease. His radial pulse was regular, equal in both wrists, sufficiently full, and of normal frequency. The left carotid and temporal were less manifest than the corresponding arteries on the right. By the laryngoscope, the parts of the larynx and throat were seen to be normal. The physical signs were as follows:

Flatness to second rib at the right, and over the whole of the left breast down toward the side. Behind, there was a very little less sound in the lower two or three inches of the left back.

Inspection showed nothing remarkable, except that the heart was seen faintly pulsating a little outside of a line let fall from the nipple, and lower down than usual. No local prominence, nor was there any manifest difference between the motions of the two breasts. Behind, motion was decidedly less of the left scapula than of the right.

Palpation. The apex of the heart was felt beating, not forcibly, lower and more towards the left side than usual. There was a thrill felt about the second rib on the left breast. Behind, nothing peculiar, and no pain produced by smart blows or by pressure over the various vertebræ.

On auscultation, the respiratory murmur was scarcely heard under the right clavicle down to the second rib. Loud puerile murmur heard immediately below and in the major part of the same lung,

front and back. Almost total absence of respiration in the left breast and side where flat. The murmur was normal, but less in the left than in the right back, and where there was dulness on percussion the murmur was quite obscure and somewhat bronchial. No râle anywhere in either lung. The sounds and impulse of the heart were heard and felt an inch lower down and more towards the side than usual. The sounds were normal. About the second and third ribs in the left breast was a double beat, as of the two sounds of the heart, and impulse was conveyed to the ear. Under the right clavicle was a bellows murmur.

The sudden hoarseness and its persistence; the violent neuralgic pains of the face and neck, and finally of the thorax; the peculiar paroxysmal, violent and often apparently ineffectual cough, and the absence of all signs of tubercular or malignant disease; the retention, in fact, of perfect health, except in the particulars named—these positive and negative phenomena, combined with physical signs showing conclusively that there was something preventing the free action of the front part of left lung and upper part of the right; the double beat, as of a second heart, heard in the left breast, and the bellows murmur under the right clavicle—all these phenomena seemed to indicate clearly the existence of an aneurism of the arch of the aorta. It moreover *seemed*, from the extensive dulness, to be quite a large one, interfering with the inferior laryngeal nerve and the nerves of the neck and chest. Regarding it in this light, and having, I confess, not seen the pamphlet of Dr. Tuffnell, to which I shall presently allude, I did not deem it necessary to do anything more than to frankly tell the patient of the nature of the disease, and to warn him against over-exertion in anything, to keep the digestive functions in good order, and for the pains I suggested subcutaneous injections. He had previously used various remedies—all without avail. I allowed him to attend *moderately* to business.

Dec. 15th—just thirteen days after I saw him—he visited the city, transacted business as usual, seemed quite well, went home, sat down and read during the evening, and retired to bed; fell asleep and awoke, as usual, with pain. His wife gave him an opiate, and he then fell asleep. She awoke in the morning and found her husband standing up by the bedside, bleeding copiously. In a minute or two he sank on the floor and expired without uttering a word. He had concealed the fact of the dangerous nature of the complaint. The blood that came from his mouth filled half of a washbowl and half of a chamber vessel.

The autopsy, as given by the attending physician, presented the following results:—In the left chest was about three pints of a serous fluid. The lung was condensed and incapable of respiration; no signs of inflammation. In the right chest were old pleuritic adhesions, with old tubercles at the apex. The bronchial tubes were filled with blood. Stomach and duodenum also filled with the same.

Liver softened. Kidneys soft and flaccid, and under the microscope showed fatty degeneration. The heart was normal, but an aneurism, about two inches in diameter, arose at the back of the arch of the aorta. It had pressed upon the left primary bronchus and caused a thinning of its walls for a space of one and a half or two inches, and in one part a rupture had taken place through a small aperture. The inferior laryngeal nerve was flattened out and nearly lost in the wall of the tumor. Neither of the vessels springing from the arch was obstructed. The aorta throughout its course was atheromatous, and a small aneurism, just commencing, about the size of the top of the thumb, was found a little above the origin of the vessel.

A few remarks may be made on the above. The fluid in the chest must have increased during the fortnight after I saw him, for if three pints had existed at my examination the heart would not have been to the left side, but would have been dislocated toward the right, and greater dulness would have been found in the left back. The tubercles at the apex of the right lung, though not suspected from the account the patient gave of his previous life, explained the dulness and absence of respiration under the right clavicle. I suppose that the dulness in the left breast must be explained by the condensation of the lung, owing, perhaps, to the pressure on the bronchial tube leading to it, as Dr. Ellis has described such results to occur in certain cases of aneurism.* It made the aneurism appear very large, whereas it was comparatively small.

Only after his death did I have an opportunity of seeing Dr. Tuffnell's pamphlet, which proposes the revival, with modifications, of Valsalva's method of treatment in cases of internal aneurism. Dr. Tuffnell's pamphlet is entitled "The Successful Treatment of Internal Aneurism, illustrated by Cases in Hospital and Private Practice."† I intend to make use of the facts contained in it. I shall present some views of treatment different, in a measure, from those of Valsalva and Tuffnell, while at the same time I shall depend upon both of them for my own suggestions. I think it best, therefore, as introductory to the remarks, to refer to the history of this treatment of internal aneurism.

Somewhat more than a century and a half ago, Albertini and Valsalva, professors in the famous and ancient University of Bologna, revolving together one of the directions of Hippocrates for the proper way of curing varices—viz., by drawing blood from them and using a *dry* diet—determined to try that treatment in the cure of internal aneurism. Accordingly, adopting what we must suppose, at least, to have been another precept of Hippocrates—viz., quietness of body during the attempt at cure—they agreed to put all their patients suffering from internal aneurism under the three following rules:—1st. Repeated venesection. 2d. A peculiar and very restricted diet. 3d.

* See Boston Medical and Surgical Journal, Dec. 4, 1856; Nov. 2, 1861.

† By Jolliffe Tuffnell, F.R.C.S., M.R.I.A. Churchill, 1864.

Rest in bed. It appears from Morgagni's* account of the method that Valsalva first tried the plan, which Morgagni thus describes. "When Valsalva had taken as much blood as was necessary, he ordered the quantity of meat and drink to be diminished more and more every day, until only half a pound of pudding was taken in the morning and only half that quantity in the evening, and nothing else except water, which was measured and medicated. After the patient had been sufficiently reduced by this method, so that he could scarcely raise his hand from the bed to which, by Valsalva's directions, he was confined, the quantity of aliment was, day by day, increased until the strength that was necessary for him to get up had returned." With this treatment Valsalva had been very successful in those cases where the patient would submit to the course laid down.

Although it is by no means evident that Valsalva always prescribed very *frequent* bleeding, still that seems to have been understood as his *chief* element of cure, and every one, in speaking of that method since, means repeated venesection; the rest and restricted diet being of inferior importance, and *absolute* quiet being hardly thought of. Even as late as the last quarter of a century, Dr. Hope, certainly one of the most eminent writers of the day on diseases of the chest, when speaking of Valsalva's method, writes of venesection being made under his own care to the amount of ten ounces twice daily for six or seven days; that is, from one hundred and twenty to one hundred and forty ounces in a week. In one case he says "ten ounces daily were taken for sixteen successive days, with excellent result." But on the whole, he prefers "rather larger bleeding at once, say fifteen to twenty ounces, and ten or fifteen ounces twelve hours afterwards, then six or seven ounces every six hours afterwards for a time." He admits, however, that reaction does at times occur, and that the heart instead of going more slowly really becomes more rapid under such treatment. In these days of wide-spread scepticism in regard to all active treatment, combined with the fact already noticed, that the heart becomes quicker instead of slower after repeated venesection, and the still further fact (the reverse of the opinion formerly held), viz., that copious venesections do not tend to improve but rather to deteriorate the blood, these three circumstances would naturally have led to the giving up of Valsalva's plan, if that plan rested chiefly on extravagant bleeding. But let it always be borne in mind that that plan rested on *three* great ideas, each of which I contend should be borne in mind, and neither be allowed to run rampant, so to speak, as in the earlier interpretation of the method. In our day, it seems that Dr. Bellingham and Dr. Tuffnell, revolving the whole subject, determined, as Valsalva and Albertini in olden times had done, to try the plan after nearly or quite eliminating the one element of

* De Causis et Sedibus Morborum, xxvi. 28.

venesection. Dr. Bellingham died before the completion of the joint work, and Dr. Tuffnell publishes a small pamphlet, trusting to the value of the cases recorded in it rather than to the size of his book, to make the method widely known. Surely he was correct, and if success equal to what he states he arrived at be gained by those who shall experiment after him, he is destined to hold a most enviable position as one of the profession who, by philosophic thought, has done more for practical medicine in the treatment of aneurism than any other writer since Hippocrates. For surely a physician who *seems* to prove that five cases out of six of any disease heretofore considered incurable, save by the most devoted follower of Valsalva, are now curable, deserves the highest reputation. I do not exactly like Dr. Tuffnell's statements in regard to Valsalva. In the early part of his pamphlet he says that he had thought that the views entertained by the great Italian might be confirmed by practice, and at another part he says that he considered that Valsalva's views modified would bring about the desired object in the cure of internal aneurism. But later he speaks of his (Valsalva's) propositions as being "ill conceived," while at the same time he adopts two of them—viz., the recumbent position and the restricted diet, which latter is very nearly identical with that of his predecessor, and is the most annoying to the patient, while I do not think that he would wholly refuse an occasional venesection, under peculiar circumstances. The fact is, Dr. Tuffnell's plan is Valsalva's, and the propositions are Valsalva's, only Dr. Tuffnell wisely *modifies* them. Before the end of this paper, I hope to suggest a still further modification. I propose to the members to carry out this course whenever any one has a case, and report the result to this Society. Perhaps in this way we may in ten or twelve years get our quota of evidence that may still further aid the profession in the treatment of this dire disease. In order to elucidate the subject, let me give you a very brief analysis of Dr. Tuffnell's cases:—

1st. An Irish carman, æt. 35; 1851, in hospital; aneurism abdominal, aortic, size of an orange. Treatment—horizontal position three months. Food— $\frac{3}{4}$ viii. solids, $\frac{3}{4}$ vi. liquids in twenty-four hours. Recovery perfect.

2d. Seaman, æt. 39; 1854, in hospital; internal aortic aneurism—undoubted. Ten weeks perfect rest and restricted diet. Complete recovery.

3d. Die-cutter, æt. 54; 1854, in hospital; aortic aneurism, projecting through sternum; all the severer symptoms; integuments alone covering tumor. In three months "general health excellent," and all local signs less; tumor had grown firmer. Finally, he resumed work. Varicose, external vessels were seen in great numbers three years afterwards. The man still at work.

4th. A fat, indolent merchant, with abdominal aneurism five inches in diameter. In three months, tumor quite solid, though pulsating. Thirteen weeks on his back.

5th. A gentleman, æt. 30; a hunter and high liver; October, 1855. Aneurism at the bifurcation of the aorta. In nine weeks, better; in six months, no pulsation remained. He then made over-exertion and needed venesection; again relief. Subsequently, other surgeons saw him and laughed at the idea of there being aneurism, and advised hunting, &c., as before. In eighteen months the aneurism suddenly burst.

6th. Laborer, æt. 30; in hospital, January, 1864. Abdominal aneurism. Pulse, 104 standing, 66 lying. Disease checked by treatment.

Certainly these are very significant facts, even if there were many more in which there may have been less success. But let me now revert to the plan pursued, whereby these results were obtained.

Dr. Tuffnell's treatment was, first, perfect rest in a recumbent position for two or three months, during which time the patient never raised himself, even to the semi-recumbent posture, but might turn carefully from side to side, and at times lie on his face to relieve his back. He was directed to have some one at hand to assist and to read to and talk with him. He was to be placed in a sunny room, and, if possible, where he could see somewhat of what was going on out of doors and be generally amused. His bed was to be soft, and arranged properly for his stools, &c. Second, he was to have a "restricted diet"—viz., three meals per diem. For

Breakfast, white bread and butter,	3 ij.	milk or cocoa,	3 ij.
Supper, " " " "	3 ij.	" or tea,	3 ij.
Dinner, { meat, broiled or boiled,	3 iij.	water or claret,	3 iv.
	3 iij.;		
Total,		3 x.	3 viij.

and "no more" (page 30, pamphlet). Under this course, Dr. Tuffnell claims to have cured five out of six cases of aneurism of the aorta, and one of them large enough to project through the sternum.

In reflecting upon the subject, the following suggestions naturally occur. Wherein consists the real difference between the plans followed by Valsalva and Dr. Tuffnell, save in the *reasonable* use of venesection by the latter? Dr. Tuffnell says, "the starvation plan spoken of by Valsalva, if employed with bleeding, would prevent the possibility of fibrine being renewed in the blood after it was removed by venesection." Yet he advises an equally starving plan when he orders such a diet as that given above. It is, in fact, the most annoying part of Dr. Tuffnell's principles of action. A few months since, Dr. H. J. Bigelow, of this city, was trying Dr. Tuffnell's plan upon a patient at the hospital, and the patient eloped. Dr. T. expressly states that it would not be submitted to by *one* of his own patients, and he does not tell us how many others were unwilling to submit to it, although he intimates that there were some others.

Let us consult physiology on this matter. A healthy man, according to Dalton,* needs, while exercising during the day, $\frac{3}{4}$ xlviij. of solid food and $\frac{3}{4}$ li. of liquid. In other words, five times as much solid and more than six times as much liquid as Dr. T. allows. Hence it seems to me that Dr. Tuffnell's criticism upon the "starvation" plan of Valsalva is hardly just by the side of his own; for Valsalva, as Morgagni tells us, gave $\frac{3}{4}$ xij. of solid food—that is, $\frac{3}{4}$ ij. more than Dr. Tuffnell allows—and an indefinite amount (restricted doubtless) of liquid *per diem*. Now the question that arises in my own mind is, whether Valsalva and Dr. Tuffnell are not both wrong in carrying out the "starvation" plan, and whether a *modified* diet, and yet enough to satisfy the cravings of hunger and thirst, may not be allowed with perfect safety, and also with success, in the cure of aneurism, provided perfect rest of the body be enjoined. To discuss this question, let us refer again to the physiologists and see what they will tell us. Dalton gives the following as the composition of the blood. In one thousand parts—

Fibrine	-	-	-	-	-	-	-	-	-	4.05
Albumen	-	-	-	-	-	-	-	-	-	78.84
Water	-	-	-	-	-	-	-	-	-	902.90
Phosphates of lime and magnesia, sulphates of soda and potass., chlorides of sodium and potassium	-	-	-	-	-	-	-	-	-	8.55
Fat	-	-	-	-	-	-	-	-	-	1.72
Extractive matters	-	-	-	-	-	-	-	-	-	3.94
										<hr/> 1,000.00

The whole object of Hippocrates by his diet, and of Valsalva with his "starvation" plan and of Tuffnell with his "restricted" diet is, *first*, to make the blood more thick, less watery, and, on the part of the two later writers, to make it fibrinous, so that coagula may form in the vessels. *A priori*, therefore, one would think that a moderate amount of a *peculiar* diet rather than a starving treatment would be the wisest. In other words, we should use a kind of diet that, while satisfying the absolute cravings of appetite, should be so arranged as,

1st, To leave in the vessels the least quantity of blood consistent with health.

2d, To increase the amount of fibrine.

3d, To diminish the amount of watery constituents.

To gain the first, we of course (and every patient would agree to the proposition) should reduce the total amount of food taken, when lying constantly without exercise, from what it would be when in exercise. But is it necessary to reduce it to one fifth or one sixth the amount, as Valsalva and Dr. Tuffnell do?

* A Treatise on Human Physiology, by John C. Dalton, M.D. Philadelphia, 1859.

Why would not one half or one third of the amount be sufficient to gain the end we have in view, and that without inflicting the distress of hunger or thirst upon our patient? I suggest this as a thought bearing upon the still further modification of Valsalva's really excellent plan. It seems to me that it is better than the starvation plan followed by him and Tuffnell. 2d. How shall we increase the amount of fibrine? Evidently all substances capable of being converted into fibrine should be used, and others kept in abeyance or wholly eschewed. Milk, eggs and meat would, I think, according to Liebig, be preferable for this end. Dr. Hammond* sustains this view, and by direct experiment on himself proves that the ends I propose are brought about by an albuminous diet; viz., the water is lessened, the fibrine and generally the solid substances of the blood are increased. His experiments in the use of starch prove that fibrine may be increased by that article also, but the blood will be otherwise deteriorated and the health impaired, which evidently we do not want. 3d. We could diminish the watery elements by diminishing drinks and succulent vegetables. Some liquids are absolutely needed, but why keep the patient constantly thirsty? Let him take small quantities often. Let him often rinse the mouth in addition to chewing a pebble, as Dr. Tuffnell suggests, and thus excite the salivary glands and relieve thirst.

But does physiological chemistry teach us as yet how to thus *materially* modify the characteristics of the blood? I am not aware of any physiological experiment to meet this desirable end, and it is well worthy of our serious attention. May it not, therefore, be suspected that too much stress has been laid by all, from Hippocrates down through Valsalva and Tuffnell, upon this element in the Hippocratic plan? It may, indeed, be asked, whether Valsalva and Albertini did not wholly misunderstand the meaning of Hippocrates when, instead of his "dry" diet, they tried the "starvation" plan that has been followed ever since. May not the third element, viz., the perfect quiescence and horizontal posture of the patient, be the *main* principle of the three, the other two—viz., the venesection and the dieting—being only subsidiary and to be used *rationaly* in connection with the greatest power of the three, the absolute rest in a horizontal posture?

Let us now examine this third great principle of Valsalva, viz., that of rest in a horizontal posture. There is no evidence that, although he used it, he laid great stress upon it or considered it otherwise than subsidiary to his other principles of treatment—viz., repeated venesections and the dry diet of Hippocrates, or nearly starvation system carried out by himself, and which has been followed so closely by Dr. Tuffnell—so closely, in fact, that both have met with the same difficulties, viz., the unwillingness of patients to sub-

* Physiological Memoirs. Philadelphia, 1863.

mit to the plan proposed. Let me remark, *en passant*, that it is very curious to notice in this history of the treatment of aneurism how each writer has been influenced by the great laws of public thought prevailing in his day. At the time of Valsalva every one bled freely. It was considered that venesection *saved life* in thousands of cases of disease, and that even the healthy might not only with impunity, but with absolute benefit, be freely bled at times and without any grave symptoms being present to indicate its necessity. I can remember, when I was a pupil, that men would demand of me the use of my lancet because they "had always been bled in the spring." How different the fact now. A physician of twenty years' practice told me, a few weeks since, that he had no lancet, and that he really did not know practically how to bleed. Of course, therefore, Valsalva's plan was doomed to utter contempt at this present day if phlebotomy to any amount was to be allowed as the prime means of cure. But fame said that by it the old masters had cured not a few patients. Our medical maxims of the present day would almost deny the possibility of cure by such means, and we are necessarily led to seek for some other explanation of Valsalva's success. Tuffnell seeks for it in rest and a very restricted diet. He proves the value of rest to be immense. May it not, I repeat, be the *chief* element, aided, in a small degree, by a *modified* diet rather than a greatly restricted one? In 18—, Dr. Bellingham recommended the treatment of aneurism by simple pressure and by restraining the current of blood. There is nothing more powerful in the whole range of medical treatment upon the force and rapidity of the current of blood in the arteries than the change from a standing to a recumbent position. We have already seen that in one of his cases Dr. Tuffnell reports a difference of thirty beats, viz., from 96 standing to 66 lying, or 1800 beats per hour less when recumbent than when standing, or 21,600 beats in twelve hours! How enormous must be the influence, provided it be a constantly observed fact. I made some few investigations on this point, which seem to confirm Dr. T.'s views, although the difference is not so great as he gives.

In my own family, from five healthy persons, I got the following result:—

	Age.	Standing.	Sitting.	Lying.	92 radial pulsations per minute.			
Boy	13	114	94	58	"	"	"	"
Woman	25	68	70	74	"	"	"	"
"	25	80	72	60	"	"	"	"
"	40	62	64	60	"	"	"	"
Man	57	84	74	60	"	"	"	"
Averages		81·6	74·8	70·0	"	"	"	"

or 11·6 pulsations less in the lying than in the erect posture, which is equal to 696 less pulsations in an hour when lying than when erect.

At the Massachusetts General Hospital, Mr. Nichols, House Physician, kindly obtained for me the following:—

In Surgical Cases without Organic Disease.

	Age.	Erect.	Sitting.	Lying.
Male	23	74	55	48
"	25	78	60	55
"	27	84	71	67
"	23	90	75	65
"	24	100	88	84
"	23	84	76	64
"	32	70	65	64
"	30	76	72	64
"	35	88	78	70
"	19	88	78	76
"	33	76	64	64
"	65	96	82	72
Female	34	96	94	90
"	28	80	76	70
Averages		91.42	73.85	68.07

Diseased Persons.

	Age.	Erect.	Sitting.	Lying.
Male	28	86	82	76
"	50	82	70	68
"	31	88	78	74
"	40	108	100	92
Female	13	110	88	76
"	40	82	76	70
"	25	92	82	80
"	60	94	92	82
"	15	100	90	84
"	34	88	72	66
"	32	102	88	80
Averages		93.81	83.45	77.09

These tables seem to indicate that the average pulse is more rapid in the diseased than the healthy in all three positions. This might be anticipated. In each class, the standing position increases very much the rapidity of the pulse, but rather more in the healthy than in the unhealthy, being 23.35 more in the former to 16.72 more in the latter class. The results in health are analogous to those noticed by Dr. Guy, of London, many years ago.* Thus, in one hundred healthy males of the mean age of 27, Dr. Guy found the mean numbers of the pulse were, while standing, 79; sitting, 70; and lying, 67. He found, also, that by raising a person without allowing him to make any muscular effort the pulse was but very little altered, thus proving that it is the muscular effort made in standing erect, rather than the position itself, which is the cause of a quickened pulse.

Comparing this powerful influence on the rapid flow of the blood with the little real influence that we can have on the composition of the blood by any diet, and the doubt one has as to whether the increase of the fibrine is really a desirable object to be obtained, and that it forms but a very small constituent part of the circulating fluid, I think we are led to suspect that, after all, this element of quiet in a horizontal position is the most important agent of all the three originally proposed even in Hippocratic days, hinted at and

* Guy's Hospital Reports, Nos. vi. and vii.

followed by Valsalva, and distinctly pressed upon our notice by Dr. Tuffnell, but after all not really so much relied upon as it ought to have been by him or by his predecessors. On the contrary, he evidently considers the very restricted diet as a very important part of the treatment, and he carries this to so great an extent as may hereafter prevent, as it has already prevented, many from submitting to it. This brings me to the final suggestions I wish to make upon this subject. Why not, without giving up either of the principles laid down by Valsalva, use *all of them rationally* and neither of them *heroically*, unless the very quiet rest of the body be considered heroic? Let me touch again upon each one.

1st. Venesection. I should have no hesitation in using venesection, to a moderate amount, in any case where the pulse was full and strong, and there was much pain and throbbing in an aneurismal tumor. I would use it once, perhaps twice, at intervals of days, to a moderate amount—to ten or possibly twelve ounces at one time. Leeches might certainly be used where there was much local pain or swelling.

2d. Diet. I would simply reduce it to that amount that would just satisfy without overloading the stomach. It should consist of the usual simple meats and vegetables. I should certainly use eggs and meat and albuminous substances generally, in preference to others. I should think the food might be reduced one half.

3d. I would rigidly enjoin *absolute rest horizontally*. The patient should not *once rise* for two or three months. He should have, as Dr. T. suggests, a room as perfectly agreeable as possible, and attendants to aid and amuse him. I would have a bed made for his convenience, and an apparatus by crank, pulleys, &c., to raise him twice daily, still in a horizontal posture, so that the back could be bathed and the bed made anew.

4th. Various medicines might be used, according to the peculiarities of the case—among others, digitalis, veratrum viride, &c., tending to lessen the frequency of the pulse. So tonics, laxatives or opiates might be required. Cold might be placed and pressure might be made over the aneurism.

By these means we may hope, I think, to check, if not permanently cure, many cases of internal aneurism, even of the most serious character. I sincerely hope that, if any member of the Society has a case of internal aneurism, he will think of the plan and faithfully report to us the result.

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